IN THE CLAIMS

Richard Harris was the applicants attorney-of-record until 2001.

The claims which have been amended here are those which stood in the case just prior to Mr Harris' response to a final office action and subsequent appeal in 2001. Because the USPTO has not yet formally made a response to Mr Harris' amendments, this Supplemental Amendment supercedes the submission made by Mr Harris.

Please cancel the following claims:

80
127

Please renumber the claims as scheduled below:

1 to 53				previously cancelled
	54	becomes claim	198	
	55	"	221	
56 - 59				previously cancelled
	60	"	224	
	61	"	242	
	62	"	243	
	63	"	258	
	64	"	259	
	65	"	244	
	66	"	245	
67				previously cancelled
	68	"	247	
69				previously cancelled
	70	"	248	
	71	"	263	
72 - 74				previously cancelled
	75	"	256	
	76	"	249	
77				previously cancelled
	78	"	257	
79				previously cancelled
80				Cancelled in this amendment
	81	"	250	
	82	"	270	
	83	"	255	
	84	"	266	
	85	"	267	

	86	"	268
	87	"	269
88			previously cancelled
	89	"	271
	90	"	274
	91	"	275
	92	"	276
93 - 97			previously cancelled
	98	"	251
	99	"	252
	100	"	260
	101	"	272
	102	"	265
	103	"	273
	104	"	261
105			previously cancelled
	106	"	277
	107	"	297
	108	"	246
109 & 110			previously cancelled
	111	"	223
	112	"	253
	113	"	264
	114	"	254
	115	"	262
	116	"	219
	117	"	298
	118	"	321
	119	"	240
120			previously cancelled
	121	"	334
122 & 123			previously cancelled
	124	"	202
	125	"	226
	126	"	281
127			Cancelled in this amendment
	128	"	325
	129	"	216
	130	"	237
	131	"	293
	132	"	305
	133	"	339

134	"	203
135	"	227
136	"	282
137	"	301
138	"	326
139	"	201
140	"	225
141	"	280
142	"	300
143	"	324
144	"	215
145	"	235
146	"	292
147	"	306
148	"	338
149	"	204
150	"	228
151	"	283
152	"	302
153	"	327
154	"	206
155	"	229
156	"	284
157	"	304
158	"	329
159	"	208
160	"	231
161	"	286
162	"	308
163	"	332
164	"	207
165	"	230
166	"	285
167	"	307
168	"	330
169	"	210
170	"	312
171	"	233
172	"	209
173	"	311
174	"	232
175	"	220
176	"	320

177	"	241
178	"	279
179	"	299
180	"	323
181	"	211
182	"	234
183	"	313

184 - 197 previously cancelled

Please add the following new single dependent claims, total 41 claims, as set out in the annotated schedule of all claims::

199, 200, 205, 212, 213, 214, 217, 218;

222, 236, 238, 239;

278, 287, 288, 289, 290, 291, 294, 295, 296;

303, 309, 310, 314, 315, 316, 317, 318, 319;

322, 328, 331, 333, 335, 336, 337, 340, 341, 342, 343.

Please add the following multiple dependent claims, total 4 claims, each reading on 20 claims, as set out in the annotated schedule of all claims:

344, 345, 346, 347.

Please amend the claims according to the attached annotated schedule of all the claims presently in the case. Deletions are denoted by strikeouts between parentheses; additions are underlined.

A clean listing of all the claims in the case as herewith amended is separately attached.

To assist in the review of the claims, a schedule referring each claim to the relevant portion of text and relevant figure(s) is separately attached.

IN THE DRAWINGS

Please note that at some point since the filing of the CIP of August 1988 and the present, filamentary material 3128a was added to Figures 129 through 132. The schedule of claim references points out those places in the text which say any feature can be can be combined with any other feature.

The request to enter the above changes may not have been made at the proper time, and they are now respectfully made here.

Please add Figures 281 and 282 on sheet 40, to clarify the disclosure in the second paragraph of page 33 of the text. A clean copy of amended sheet 40 is enclosed, labeled "2nd Replacement Sheet".

REMARKS

INTERVIEW WITH THE EXAMINER

At the applicant's meeting with the examiner this April 10th, the present case was reviewed.

The applicant apologized for the poor quality of material that had from time been submitted to the examiner, and accepted much of the responsibility. In the case of the diagrams, some of the drawings were too small or unclear, many were too close together, and others had identifying numerals that were too small. In the case of the claims, there was much poor wording, varying and confusing designations of the same features, and there were many errors. He undertook to remedy all defects as far as possible.

About two years ago, in an earlier case with the same disclosure (application 08 / 477 704), the examiner had requested certain corrections to the text, to more precisely relate the claims to the disclosure. The applicant undertook to make the identical changes in the present case, and these are part of this amendment.

The relevance of prior art Nallinger 3 112 810 was reviewed. The parties agreed that Nallinger's intent was entirely different to the applicant's, but the examiner pointed out that structure was much more important than intent or function. The applicant undertook to distinguish his structure over Nallinger's.

The applicant pointed out that his patent attorney from 1982 up to the time of the appeal filed in April 2001, Richard Harris, was commercially unsophisticated, and gave no or poor advice on how the invention should be claimed to obtain the strongest commercial - as opposed to legal - protection. (Obtaining the strongest commercial protection is generally the sole objective in filing a patent application.)

While the present case was under appeal, parallel application 08 / 477 704 with the same disclosure had four main claims allowed, all claiming combined motion. The applicant pointed out that two claims in the present case relating to combined motion were very similar, if not identical, to those in the allowed case. He proposed in two main claims old numbers 54 and 55 to delete the references to combined motion and to combine the features recited with new restricting feature(s) from previously allowed dependent claims.

Previously allowed main claim old number 107 was reviewed, and both parties agreed that, since allowance, prior art had been discovered which appeared very close to, if not reading on, claim 107. The applicant agreed to review all previously cited prior art, as well as art in class 123 subsection 41.14, and make changes to the claim as necessary, by combining with a previously allowed dependent claim. He also undertook to cite appropriate prior at for each of the other main claims. (In the above, by a previously allowed claim is meant one allowed earlier in the application, not necessarily reading on the main claim under review.)

In the case at appeal in 2001, only main claim old number 61 had a full slate of dependent

claims. The applicant proposed to copy claims of the same subject matter as for claim 61 to read on the other claims, where they were missing, which the examiner would review. It is the general understanding of the applicant that these claims were allowable, but had been objected to because main claim 61 was not in order.

Mr Harris had previously given the applicant to understand that a negative, such as an "un-cooled engine", could not be claimed. Since the major part of the invention relates to un-cooled engines, it was agreed that the applicant could submit dependent claims relating to an engine without cooling, for the examiner's review.

The applicant pointed out that a major feature of the invention, the tensile crank links, were not specifically claimed in the present case. (They were the subject of many allowed claims in a parallel case with the same disclosure, application 08 / 441 117, abandoned after notice of allowance and payment of issue fee. Copies of the allowed claims in that case can be forwarded, if desired.) He proposed to modify a claim dependent on main claim old number 61 to recite these, and to submit similar other dependent claims for the examiner's review.

The applicant pointed out that the names for the same element varied in different claims, and that elsewhere (sometimes in the same claim) one word would mean different things. He proposed standardizing the wording throughout all claims.

The applicant undertook to re-order the claims in orderly and logical "claim trees". The claims have been renumbered to start in a new sequence beginning with Claim 198, with the new claims inserted in the corrected claim tree sequence.. Generally in these remarks, and in the schedule of all annotated claims, the new numbers are followed by the old numbers in parentheses, where appropriate.

TEXT

In the earlier and subsequently allowed application 08/477 704 (which has an identical disclosure of text and drawings to the present case), the examiner requested that items in the disclosure, that were ambiguous or not clearly described, be clarified and fully illustrated.

The changes to the text and drawings made herewith are identical to the changes made in response to the examiner's request in the prior case, application 08 / 477 704, and remedy the same deficiencies.

One additional correction of a typographical error on page 7, listed at the end of the amendments to the text, was not made in the case of application 08 /477 704.

DRAWINGS

The changes herein are to correct errors and omissions.

CLAIMS

The claims have all ben renumbered. In the annotated claim schedule, new numbers are followed by the old number in parentheses, where applicable.

With the exceptions listed below, no new features are claimed.

In the case of the three amended main claims, one distinguishing feature was deleted and replaced by another that had already been claimed in this case.

As far as the dependant claims are concerned, distinguishing features that form claims dependant on one main claim, have here been copied to read on other main claims. (The old number of the claim being copied, prefixed by "as", is given in the annotated claim schedule.) Dependant claims which previously recited two important distinguishing features have sometimes been separated into two dependant claims. In other cases, two previously separate dependent claims have been combined into one.

During the Interview with the examiner, it was proposed to submit new dependant claims for his review on material that had not been clearly claimed before: the un-cooled engine, and the tensile crank link. Such claims are included here.

The other changes to the claims include standardization of terminology, deletion of distinguishing features that are not claimed and do not advance over prior art, tightening of language and further clarification of what is claimed, and adjustments for dependant claims to read properly on main claims,

These remarks are based entirely on the applicant's understanding of the prior art reviewed.

MAIN CLAIMS

General

As mentioned, the changes made in this amendment are to the claims as they stood just prior to Richard Harris last submission in response to office action, before the appeal was filed in 2001.

As the six main claims stood before this amendment, the same features are referred to differently. (For example, "fluid working chambers" are sometimes "fluid working volumes"; "cyclically variable capacity" is sometimes "cyclically variable volume"; a "cylinder assembly " is sometimes a "chamber assembly"; volume is used in the dependent claims to mean something else again: the space surrounding the working chambers.)

As noted above, terms have been standardized, with appropriate adjustments made in the dependent claims. Many of the deletions and additions visible in the schedule of annotated claims are due to this standardization of terms.

Those five main claims reciting toroidal working chambers define them as being formed by a component (piston) projection reciprocating in a cylinder assembly depression. Very few of the toroidal chambers in the prior art have this feature; it has been noted where it was found.

In the claims, the word "housing" indicates a housing to substantially encase or enclose the device, while "structure" is that which defines a partly circumferential volume about the cylinder. If there is a housing, the structure would substantially be within it. For example, in Figure 78, item 1328 is housing, while 1327 and the double hatched component defining volume 1325 is structure; in Figure 131, item 3057 is a housing, while 2127 is structure; in Figure 138, item 3127 is structure, while 3181 is a housing.

The applicant has reviewed extensive prior art, as noted under each of the main claims and at the end of these remarks. The art reviewed included all that which had been cited on the many different claims made in several earlier applications based on disclosures similar to the present one. Under each main claim is listed the prior art that contains at least one of that claim's distinguishing features.

> *One citation is not listed under the main claims below. US 5 562 079 Gray recites only a cylinder surrounded by insulation. It does not recite any of the other limiting features of the various main claims. It was filed in February 1995, well after the last CIP disclosure in the present case.*

In the applicant's opinion and according to his understanding, none of the art read on the main claims as herein amended. He respectfully submits that this case is now in condition for allowance.

*Old Claim **(54)**, renumbered as Claim **198***

The changes are as reviewed with the examiner, in that the motion-related feature is deleted, and the thermal insulating material to the housing added.

The housing now "encloses" the cylinder assembly. See remarks on Nallinger at end of those on main claims.

The cylinder assembly now "containing" the component serves to separate the assembly and the component. As the claim did read earlier, the component was part of the cylinder assembly, so claim 205 (134) did not properly distinguish over claim 204 (124). Where appropriate, a similar change has been made in other main claims.

The component's structural member was deleted, because none of the dependant claims read on it and it did not distinguish over prior art.

Cyclically variable "volume" has been changed to "capacity", to standardize language with other main claims.

Below is a list of prior art which, in the understanding of the applicant, describe only some of

the features recited in this claim. A similar list is attached under the remarks on each of the other main claims.

593 248	*Smith*	*Appears to recites only pair toroidal working chambers.*
1 276 346	*Gould*	*Recites only pair toroidal working chambers.*
1 390 281	*Doyle*	*Recites only pair toroidal working chambers.*
1 629 686	*Driesbach*	*Recites only pair toroidal working chambers.*
1 777 007	*MacKenzie*	*Recites only pair toroidal working chambers.*
1 801 633	*MacKirdy*	*Recites only pair toroidal working chambers.*
1 902 781	*Isle*	*Recites only pair toroidal working chambers.*
2 070 769	*Wurtele*	*Recites only pair toroidal working chambers.*
2 473 936	*Burrough*	*Recites only pair toroidal working chambers.*
2 918 045	*Brown*	*Recites only pair toroidal working chambers formed by projection / depression.*
2 957 305	*Sabol*	*Recites only pair toroidal working chambers.*
3 340 855	*Brown*	*Recites only pair toroidal working chambers formed by projection / depression.*
3 358 656	*Panhard*	*Recites only pair toroidal working chambers.*
3 667 876	*Boyd*	*Recites only pair toroidal working chambers formed by projection / depression.*
3 757 748	*Arney*	*Recites only pair toroidal working chambers.*
3 955 543	*Brown*	*Recites only pair toroidal working chambers formed by projection / depression.*
3 994 632	*Schreiber*	*Recites only pair toroidal working chambers.*
4 180 028	*Richter*	*Recites only pair toroidal working chambers.*

4 414 927	Simon	Recites only pair toroidal working chambers.
4 913 100	Eikmann	Recites only pair toroidal working chambers formed by projection / depression.
Germany 200 607	Schlossere	Recites only pair toroidal working chambers.
Germany 3 607 421	Rest	Recites only pair toroidal working chambers.
Germany 3 842 802	Eickmann	(See US 4 913 100) Recites only pair toroidal working chambers formed by projection / depression.
UK 23 441	Schwartz	Recites only pair toroidal working chambers.

No recital was found of a cylinder assembly being mounted in a housing.

No recital was found of a housing being partly of thermally insulating material.

Old Claim **(55)**, renumbered as Claim **221**

The changes are as reviewed with the examiner, in that the motion-related feature is deleted, and the thermal insulating material to the housing added.

This was the claim where all the terminology was different from that used elsewhere, and here the most standardization changes have been made, as described under General above.

The housing now "encloses" the cylinder assembly. See remarks on Nallinger at end of those on main claims.

The cylinder assembly "contains" the component. See remarks for claim 198 (54).

The second "passage", where referring to movement, has been changed to "transfer", to avoid confusion.

593 248	Smith	Recites only component with internal passage piercing working volume.
1 276 346	Gould	Recites only non-reciprocating component with internal passage piercing working volume.
1 777 007	MacKenzie	Recites only a component with an internal passage.

1 801 633	MacKirdy	Recites only pair toroidal working chambers, component with internal passage. (Ilems 5 and 6 are conduits, 19 a side pressure chamber, 25 a side exhaust chamber.)
1 902 781	Isle	Recites only component with internal passage apparently for cooling air, not for transfer of worked fluids.
2 918 045	Brown	Recites only component with internal passage piercing working volume. (Item 13 is a water jacket, item 20 a conduit.)
2 957 305	Sabol	Recites only component with internal passage piercing working volume. (Items 31 and 33 are annular areas for fluids worked by chambers.)
3 340 855	Brown	Recites only component with internal passage piercing working volume. (Item 13 is a water jacket, items 42, 45, 46 are for piston coolant.)
3 955 543	Brown	Recites only component with internal passage piercing working volume.
4 217 865	Barrett	Recites only component with internal passage.
4 218 994	Reed	Recites only component with internal passage.
4 250 844	Tews	Recites only component with internal passage.
4 913 100	Eikmann	Recites only component with internal passage piercing working chamber.
Germany 167 647	Hamburger	Recites only component with internal passage piercing working chamber.
Germany 3 607 421	Rest	Recites only component with internal passage piercing working chamber.
Germany 3 842 802	Eickmann	(See US 4 913 100) Recites only component with an internal passage piercing working chamber.

No recital was found of the cylinder assembly being mounted in a housing.

No recital was found of a housing being partly of thermally insulating material.

*Old Claim **(61)**, renumbered as Claim **242***

The cylinder assembly "contains" the component. See remarks for claim 198 (54).

The second use of "assembly" has been deleted. This is partly to standardize description of the component, but mainly to avoid the confusion caused by the last clause. The claim is intended to refer to the cylinder assembly having ceramic components held assembled by fasteners in tension.

Otherwise, this claim is as submitted by Richard Harris in 2001, as overcoming all the examiner's earlier objections.

593 248	*Smith*	*Appears to recites only pair toroidal working chambers, component with internal passage.*
1 276 346	*Gould*	*Recites only pair toroidal working chambers, component with internal passage.*
1 390 281	*Doyle*	*Recites only pair toroidal working chambers, component with two extremities.*
1 629 686	*Driesbach*	*Recites only pair toroidal working chambers. (Item 24 is a water-jacketed cylinder, item 48 a positioning slot.)*
1 755 578	*Goldsborough*	*Recites only refractory - ie ceramic - lining on inside of cylinder.*
1 777 007	*MacKenzie*	*Recites only pair toroidal working chambers, component with internal passage.*
1 801 633	*MacKirdy*	*Recites only pair toroidal working chambers, component with internal passage. (Items 5 and 6 are conduits, 19 a side pressure chamber, 25 a side exhaust chamber.)*
1 812 870	*Goldsborough*	*Recites only refractory - ie ceramic - lining on inside of cylinder.*
1 902 781	*Isle*	*Recites only pair toroidal working chambers, component with internal passage, apparently for cooling air and not for fluids works by chamber.*
2 070 769	*Wurtele*	*Recites only pair toroidal working chambers, component with two extremities.*

2 473 936	Burrough	Recites only pair toroidal working chambers. (Item 41 is a conduit, items 42 and 43 are intake and exhaust manifolds.)
2 918 045	Brown	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and two extremities. (Item 13 is a water jacket, item 20 a conduit.)
2 957 305	Sabol	Recites only pair toroidal working chambers, component with internal passage and two extremities. (Items 31 and 33 are annular areas for fluids worked by chambers.)
3 340 855	Brown	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and two extremities. (Item 13 is a water jacket, items42, 45, 46 are for piston coolant.)
3 358 656	Panhard	Recites only pair toroidal working chambers, component with two extremities. (Item 9 is an inlet pipe, item 10 a delivery pipe.)
3 667 876	Boyd	Recites only pair toroidal working chambers formed by projection / depression, component with two extremities.
3 757 748	Arney	Recites only pair toroidal working chambers.
3 911 891	Dowell	Recites only ceramic coatings on inside of combustion chamber surfaces.
3 955 543	Brown	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and two extremities.
3 994 632	Schreiber	Recites only pair toroidal working chambers, component with two extremities.
4 142 500	Davis	Recites only ceramic coating to piston crown.
4 180 028	Richter	Recites only pair toroidal working chambers, component with two extremities. (Item 505 is a passageway.)
4 217 865	Barrett	Recites only component with internal passage.
4 218 994	Reed	Recites only component with internal passage.
4 250 844	Tews	Recites only component with internal passage.

4 341 826	Prewo	(Filed after applicant's disclosure of ceramic engine block and cylinder head block in May 1974. See Figures 1 through 9, text pages 7 through 9.) Recites only ceramic lining to inside of both piston and head, ceramic piston.
4 404 935	Kraft	Recites only a ceramic cap on a metal piston.
4 433 616	Hauser	Recites only a ceramic cap on a piston.
4 414 927	Simon	Recites only pair toroidal working chambers, component with two extremities. (Items 9a and 9b are gas communication ducts.)
4 466 399	Hinz	(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only ceramic lining inside cylinder, ceramic piston cap.
4 736 676	Taylor	(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only a ceramic cap on a piston.
4 796 927	Heydrich	(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only ceramic lining inside cylinder, ceramic piston cap.
4 841 927	Slee	(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only a ceramic lining inside a metal cylinder.
4 913 100	Eikmann	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and two extremities.
Germany 167 647	Hamburger	Recites only component with internal passage.
Germany 200 607	Schlossere	Recites only pair toroidal working chambers, component with two extremities.
Germany 3 607 421	Rest	Recites only pair toroidal working chambers, component with internal passage and two extremities.
Germany 3 842 802	Eickmann	(See US 4 913 100) Recites only pair toroidal working chambers formed by projection / depression, component

		with internal passage and two extremities.
UK	*23 441 Schwartz*	*Recites only pair toroidal working chambers, component with two extremities.*
UK	*1 338 712 Parr*	*Recites only ceramic cap to piston.*
		No recital was found of cylinder assembly being of multiple ceramic components being held in assembled and abutted condition by fasteners loaded in tension.

*Old Claim **(106)**, renumbered as Claim **277***

Richard Harris' basic response is left unchanged. It was to distinguish the "structure", that which surrounds and defines only the volume surrounding the cylinder, from the "housing" in other claims, which encloses the entire cylinder assembly. See remarks on Nallinger at end of those on main claims.

The first "at least one" is in the wrong place; it should before the depression, to match the qualifiers for the projection and the toroidal chambers.

The cylinder assembly "contains" the component. See remarks for claim 198 (54).

There can now be more than one opening at the component ends, the openings' function is defined. The fluid can now also be transferred from the chambers. (The previous version was needlessly limiting, considered commercially.)

To standardize, component "volume" has been changed to "passage".

593 248	*Smith*	*Appears to recites only pair toroidal working chambers, component with internal passage.*
1 276 346	*Gould*	*Recites only pair toroidal working chambers, component with internal passage.*
1 390 281	*Doyle*	*Recites only pair toroidal working chambers.*
1 629 686	*Driesbach*	*Recites only pair toroidal working chambers. (Item 24 is a water-jacketed cylinder, item 48 a positioning slot.)*
1 755 578	*Goldsborough*	*Recites only refractory lining - ie thermally insulating - on inside of cylinder.*
1 777 007	*MacKenzie*	*Recites only pair toroidal working chambers, component with internal passage and openings at each end.*

1 801 633	MacKirdy	Recites only pair toroidal working chambers, component with internal passage. (Ilems 5 and 6 are conduits, 19 a side pressure chamber, 25 a side exhaust chamber.)
1 812 870	Goldsborough	Recites only refractory lining - ie thermally insulating - on inside of cylinder.
1 902 781	Isle	Recites only pair toroidal working chambers, component with internal passage, apparently for cooling air and not for fluids works by chamber.
2 070 769	Wurtele	Recites only pair toroidal working chambers.
2 473 936	Burrough	Recites only pair toroidal working chambers. (Item 41 is a conduit, items 42 and 43 are intake and exhaust manifolds.)
2 918 045	Brown	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and cylindrical ends with openings. (Item 13 is a water jacket, item 20 a conduit.)
2 957 305	Sabol	Recites only pair toroidal working chambers, component with internal passage. (Items 31 and 33 are annular areas for fluids worked by chambers.)
3 340 855	Brown	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and cylindrical ends with openings. (Item 13 is a water jacket, items42, 45, 46 are for piston coolant.)
3 358 656	Panhard	Recites only pair toroidal working chambers. (Item 9 is an inlet pipe, item 10 a delivery pipe.)
3 667 876	Boyd	Recites only pair toroidal working chambers formed by projection / depression, component with cylindrical ends.
3 757 748	Arney	Recites only pair toroidal working chambers,.
3 955 543	Brown	Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and cylindrical ends with openings.
3 994 632	Schreiber	Recites only pair toroidal working chambers, component with cylindrical ends.
4 180 028	Richter	Recites only pair toroidal working chambers. (Item 505 is a

		passageway.)
4 217 865	*Barrett*	*Recites only component with internal passage.*
4 218 994	*Reed*	*Recites only component with internal passage.*
4 250 844	*Tews*	*Recites only component with internal passage.*
4 341 826	*Prewo*	*(Filed after applicant's disclosure of ceramic engine block and cylinder head block in May 1974. See Figures 1 through 9, text pages 7 through 9.) Recites only ceramic lining to inside of both piston and head, ceramic piston.*
4 414 927	*Simon*	*Recites only pair toroidal working chambers. (Items 9a and 9b are gas communication ducts.)*
4 466 399	*Hinz*	*(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only ceramic lining inside cylinder, ceramic piston cap.*
4 913 100	*Eikmann*	*Recites only pair toroidal working chambers formed by projection / depression, component with internal passage, cylindrical ends and opening at one end only.*
Germany 167 647	*Hamburger*	*Recites only component with internal passage and opening at one end only.*
Germany 200 607	*Schlossere*	*Recites only pair toroidal working chambers.*
Germany 3 607 421	*Rest*	*Recites only pair toroidal working chambers, component with internal passage.*
Germany 3 842 802	*Eickmann*	*(See US 4 913 100) Recites only pair toroidal working chambers formed by projection / depression, component with internal passage and opening at one end only.*
UK 23 441	*Schwartz*	*Recites only pair toroidal working chambers.*
		No recital was found of the cylinder assembly being surrounded by structure having thermal insulating properties.

*Old Claim **(107)**, renumbered as Claim **297***

The prior art that the applicant reviewed did not directly read on the claim as previously

written; all the circumferential load transmittal means were on the component itself, not on the structural member.

Because the applicant considers it possible that prior art reading on the old claim could be found, and because it might be difficult to say where the component ends and the structural member begins, he has amended this claim to delete the reference to a circumferentially mounted load transfer means and substitute recital of the cylinder assembly comprising multiple ceramic elements assembled by fasteners in tension.

The component's structural member was deleted, because none of the dependant claims read on it and it did not distinguish over prior art.

The cylinder assembly "contains" the component. See remarks for claim 198 (54).

To standardize, cyclically variable "volume" has been changed to "capacity".

The applicant felt that some of Richard Harris' wording was needlessly restrictive (commercially. The claim was limited to multiple depressions and projections and, by implication, multiple pairs of working chambers. It is modified to read on "at least one".

593 248	*Smith*	*Appears to recites only pair toroidal working chambers.*
1 276 346	*Gould*	*Recites only pair toroidal working chambers.*
1 390 281	*Doyle*	*Recites only pair toroidal working chambers.*
1 629 686	*Driesbach*	*Recites only pair toroidal working chambers.*
1 755 578	*Goldsborough*	*Recites only refractory - ie ceramic - lining on inside of cylinder.*
1 777 007	*MacKenzie*	*Recites only pair toroidal working chambers.*
1 801 633	*MacKirdy*	*Recites only pair toroidal working chambers.*
1 812 870	*Goldsborough*	*Recites only refractory - ie ceramic - lining on inside of cylinder.*
1 902 781	*Isle*	*Recites only pair toroidal working chambers,.*
2 070 769	*Wurtele*	*Recites only pair toroidal working chambers,.*
2 473 936	*Burrough*	*Recites only pair toroidal working chambers.*
2 918 045	*Brown*	*Recites only pair toroidal working chambers formed by projection / depression.*

2 957 305	Sabol	Recites only pair toroidal working chambers.
3 340 855	Brown	Recites only pair toroidal working chambers formed by projection / depression.
3 358 656	Panhard	Recites only pair toroidal working chambers
3 667 876	Boyd	Recites only pair toroidal working chambers formed by projection / depression.
3 757 748	Arney	Recites only pair toroidal working chambers,.
3 911 891	Dowell	Recites only ceramic coatings on inside of combustion chamber surfaces.
3 955 543	Brown	Recites only pair toroidal working chambers formed by projection / depression.
3 994 632	Schreiber	Recites only pair toroidal working chambers.
4 180 028	Richter	Recites only pair toroidal working chambers, component with structural member.
4 218 994	Reed	Recites only component with structural member.
4 341 826	Prewo	(Filed after applicant's disclosure of ceramic engine block and cylinder head block in May 1974. See Figures 1 through 9, text pages 7 through 9.) Recites only ceramic lining to inside of piston and head.
4 404 935	Kraft	Recites only a ceramic cap on a metal piston.
4 433 616	Hauser	Recites only a ceramic cap on a piston.
4 414 927	Simon	Recites only pair toroidal working chambers, component with structural member.
4 466 399	Hinz	(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only ceramic lining inside cylinder, ceramic piston cap.
4 736 676	Taylor	(Filed after applicant's disclosure of ceramic component assembly.) Recites only a ceramic cap on a piston.
4 796 927	Heydrich	(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic

	component assembly on 13th August 1982.) Recites only ceramic lining inside cylinder, ceramic piston cap.
4 841 927 Slee	*(Filed after applicant's disclosure of ceramic cylinder block and cylinder head block in 1974 and disclosure of ceramic component assembly on 13th August 1982.) Recites only a ceramic lining in a metal cylinder.*
4 913 100 Eikmann	*Recites only pair toroidal working chambers formed by projection / depression.*
Germany 200 607 Schlossere	*Recites only pair toroidal working chambers.*
Germany 3 607 421 Rest	*Recites only pair toroidal working chambers, component with structural member.*
Germany 3 842 802 Eickmann	*(See US 4 913 100) Recites only pair toroidal working chambers formed by projection / depression.*
UK 23 441 Schwartz	*Recites only pair toroidal working chambers.*
UK 1 338 712 Parr	*Recites only ceramic cap to piston.*
	No recital was found of a cylinder assembly being of multiple ceramic components being held in assembled and abutted condition by fasteners loaded in tension.

*Old Claim **(118)**, renumbered as Claim **321***

Richard Harris' basic response is left unchanged. It was to distinguish the "structure", that which surrounds and defines only the volume surrounding the cylinder, from the "housing" in other claims, which encloses both the structure and the cylinder assembly. Additionally, the volume has been further defined to be between the structure and the cylinder. See remarks on Nallinger at end of those on main claims.

The component's longitudinal extremity was deleted, because none of the dependant claims read on it and it did not distinguish over prior art.

"Means" was eliminated and the claim slightly rephrased.

593 248 Smith	*Appears to recites only pair toroidal working chambers.*
1 107 850 Schwartz	*Recites only volume surrounding cylinder.*

1 276 346	Gould	Recites only pair toroidal working chambers.
1 325 305	MacFarren	Recites only volume surrounding cylinder.
1 390 281	Doyle	Recites only pair toroidal working chambers.
1 531 397	Ringwald	Recites only volume surrounding cylinder.
1 629 686	Driesbach	Recites only pair toroidal working chambers. (Item 24 is a water-jacketed cylinder, item 48 a positioning slot.)
1 777 007	MacKenzie	Recites only pair toroidal working chambers.
1 801 633	MacKirdy	Recites only pair toroidal working chambers, component with internal passage. (Items 5 and 6 are conduits, 19 a side pressure chamber, 25 a side exhaust chamber; none are shown as surrounding volumes).
1 853 892	Boden	Recites only volume surrounding cylinder.
1 902 781	Isle	Recites only pair toroidal working chambers.
2 070 769	Wurtele	Recites only pair toroidal working chambers.
2 473 936	Burrough	Recites only pair toroidal working chambers. (Item 41 is a conduit, items 42 and 43 are intake and exhaust manifolds.)
2 488 093	Meinertz	Recites only volume surrounding cylinder.
2 918 045	Brown	Recites only pair toroidal working formed by projection / depression. (Item 13 is a water jacket, item 20 a conduit.)
2 925 073	Millar	Recites only volume surrounding cylinder.
2 957 305	Sabol	Recites only pair toroidal working chambers. (Items 31 and 33 are annular areas for fluids worked by chambers.)
Re 26 222 '63	Fielder	Recites only volume surrounding cylinder.
3 340 855	Brown	Recites only pair toroidal working chambers formed by projection / depression. (Item 13 is a water jacket, items42, 45, 46 are for piston coolant.)
3 358 656	Panhard	Recites only pair toroidal working chambers. (Item 9 is an inlet pipe, item 10 a delivery pipe.)

3 667 876	Boyd	Recites only pair toroidal working chambers formed by projection / depression.
3 757 748	Arney	Recites only pair toroidal working chambers.
3 955 543	Brown	Recites only pair toroidal working chambers formed by projection / depression.
3 994 632	Schreiber	Recites only pair toroidal working chambers.
4 180 028	Richter	Recites only pair toroidal working chambers. (Item 505 is a passageway.)
4 414 927	Simon	Recites only pair toroidal working chambers. (Items 9a and 9b are gas communication ducts.)
4 913 100	Eikmann	Recites only pair toroidal working chambers formed by projection / depression.
Germany 200 607	Schlossere	Recites only pair toroidal working chambers.
Germany 3 607 421	Rest	Recites only pair toroidal working chambers.
Germany 3 842 802	Eickmann	(See US 4 913 100) Recites only pair toroidal working chambers formed by projection / depression.
UK 23 441	Schwartz 1910	Recites only pair toroidal working chambers.

No recital was found of the cylinder assembly being surrounded by structure defining a volume for passage of working fluids and containing filamentary material.

Other Art Reviewed

In the applicant's opinion, the following art may not have any relevance to the main claims:

3 112 810	Nallinger	Nalliger discloses a "hat" over an engine block and spaced from it, for purpose of providing acoustic insulation. Ambient air circulates between the "hat" and the engine block.

Main claims 198 (54) and 221 (55) have been modified to disclose thermal insulation enclosing a cylinder assembly. Main claim claims 277 (106) and 321 (118) have been modified to disclose a structure surrounding a cylinder

assembly and defining a volume for passage of fluids worked by chambers between structure and cylinder. Claim 277 (106) has been further modified to the disclose the structure including thermal insulation.

Nallinger's apparatus is over the top and sides of the block but is not under it, so cannot be said to properly enclose and, in one interpretation, properly surround. Nallinger does not recite any of the other distinguishing features of these claims.

4 924 818	Linden	This was the only possibly relevant art found during a search of Class 123 Sub-section 41.14. Linden discloses in very general terms the idea of placing and engine in an insulated enclosure, and passing engine exhaust through a heat exchanger and / or a heat storage device.

Linden's filing date is 4th April 1988, after the applicants initial disclosure of an un-cooled engine coupled to a heat exchanger in May 1974, and later expanded disclosure in November 1986.

Linden gives no details of an engine, and recites none of the other distinguishing features of the six main claims.

In the applicant's opinion, the following art was not considered pertinent to the main claims:

680 465	Reynolds	926 564	Hollopeter
997 138	Keen	1 239 728	Schleppy
1 257 419	Stimpson	1 293 766	Hammond
1 453 815	Ware	2 171 946	Palmros
2 310 269	Waeber	2 315 114	Fels
2 347 364	Palumbo	2 781 031	Barberi
2 822 791	Biermann	3 042 012	Buchi
3 180 078	Liston	3 503 716	Berger
3 592 516	Standhardt	3 786 795	Kaneko
3 864 908	LaHaye	3 878 821	White
4 069 794	Jordan	4 090 479	Kaye
4 121 422	Flinn	4 136 647	Stoler
4 182 282	Shekleton	4 211 082	Bristol
4 217 865	Barrett	4 235 203	Thery
4 386 587	Simko	4 466 388	Tryhorn
4 487 168	Bajulaz	4 565 167	Bryant
4 669 431	Simay	4 715 336	Schindler

4 741 296	Jackson	4 825 820	Morgan
4 834 033	Larsen	4 872 433	Paul
4 883 778	SingDeo		

The following were filed after the applicant's last Continuation-in-Part on 29th August 1988:

5 544 627	Terziev	5 611 201	Houtman
5 642 621	Alary	5 782 084	Jarvis
5 875 863	Jarvis		

Foreign Patents:

France 758 784	Darche	UK 571	Newton
UK 485 829	Grousse		

In addition, ALL of the prior art in Class 123, Sub-section 41.14 was reviewed, comprising around 270 published patents. The only case with possible marginal relevance was 4 924 818 Linden, reviewed above.

DEPENDENT CLAIMS

General

Before this amendment, many of the dependent claims had just been copied four to six times, with their wording often not properly reading on the claims on which they depended. Every effort has been made to correct all the inconsistencies. In other claims, the language was loose or unclear, and has now been clarified or tightened.

Notes on specific claims follow below. First listed are claims dependent on main claim 242 (61), because that claim carried a full list of dependent claims. Next, claims dependant on main claim 198 (54), followed by those dependant on maim claim 221 (55), followed by those dependant on main claims 277 (106), 297 (107) and 321 (118). Where the same changes are made on similar dependent claims on other main claims, no further notes are provided.

In the case of the main claims other than 242 (61), features were often combined in one dependent claim, where they had been separated out in the case of main claim 242 (61). Subject to the discretion of the examiner, the features are now generally separated out, as they were for claim 242 (61). In a few cases, claims dependant on other main claims which were previously separated have now been combined.

In some cases, where claims reading on 242 (61) were previously not reading on other claims, they are now included in single multiple claims reading on a plurality of main and other claims.

*Dependent on claim **242 (61)***

(80) *Cancelled, because it was considered the disclosure was not full enough to properly support this claim.*

245 (66) *Simplified ("small and large end" superfluous), better and tighter language.*

246 (108) *Subject to the discretion of the examiner, the applicant would like to further restrict this claim, a kind of subset of claim 258 (66), to recite the tensile crank links, a feature taking up much of the disclosure (perhaps a sixth of the text and around 35 Figures). The feature was the subject of many allowed claims in allowed application 08 / 441 117, subsequently abandoned.*

249 (76) *"Second" added, to distinguish from fastener in main claim.*

251 (98) *Positions the surfaces at the faces of the working chambers.*

252 (99) *As above.*

256 (75) *Recites "structure" instead of "means"; locates volume between structure and cylinder.*

257 (78) *Modified to recite hot gas, for later claims.*

264 (113) *See 249 (76).*

265 (102) *Avoids using same word to describe two different things.*

271 (89) *Modified to recite second engine, for later claims.*

273 (103) *As for 265 (102)*

274 (90) *Adjusted to read on modified 257 (78) and further defined; "engine" added to match other claims.*

275 (91) *Adjusted to read on modified 257 (78), and further defined.*

276 (92) *Adjusted to read on modified 257 (78), and further defined.*

Dependent on claim ***198 (54)***

201 (139) *Modified to read so that either the assembly or the component or both could be of ceramic material.*

202 (124) *Two important distinguishing features in this claim were separated, as they were for main claim 242 (61). "Ceramic material" has been included in the prior claim. "Components" was changed to "elements" to distinguish over the component in the main claim and to match terminology used elsewhere.*

203 (134) *Two important distinguishing features in this claim were separated, as they were for main claim 242 (61). "Tubular form" is now part of claim 217.*

205 *This claim is a feature of main claims 221 (55), 242 (61) and 277 (106) in the present application, and is also as claim 3 in case 08 /477 704.*

206 (154) *This has been modified to properly define the surfaces, and to read on at least one surface having depressions. (The claim relates to labyrinth sealing; this works just as well and sometimes better if only one of the surfaces have depressions.)*

207 (164) *Two important distinguishing features in this claim were separated, as they were for main claim 242 (61). "Filamentary material" is now part of multiple claim 348. Additionally positions the "structure" within the "housing"; locates the volume between structure and cylinder.*

211 (181) *Combines the features of 255 (83) and 266 (84), reading on main claim 242 (61).*

219 (116) *After the insulated housing was combined with the main claim, this was modified to read on the "structure" having thermal insulation.*

Dependent on claim ***221 (55)***

Terminology of key components has been changed to match that used in the other main claims. Changes of terminology made in dependent claims to match that of the main claim are fairly self evident, and are not separately noted below.

240 (119) *This modification is as proposed by Richard Harris in 2001 for claim 121.*

Dependent on ***other*** main claims

The changes to the claims generally follow those made in relation to main claims 242 (61) and 198 (54), except as noted below.

127 *Cancelled. Its distinguishing features are now included in main claim 297 (107).*

298 (117) *Two important distinguishing features in this claim were separated, as they were for main claim 242 (61). Thermal insulation is now part of claim 310. The housing now "encloses" the cylinder assembly. See remarks on Nallinger at end of those on main claims.*

331 *This modification is as proposed by Richard Harris in 2001 for claim 121.*

334 (121) *"Surrounds" has been deleted, since the claim on which it depends has already recited the housing "enclosing' the structure.*

Multiple *Dependent Claims*

It was intended to copy some of the claims dependant on main claim 242 (61) to other main claims. (See Interview with the Examiner, at beginning of REMARKS Section.) In some instances it was considered more sensible to use a multiple claim to depend on the other main claims, as well as additional dependant claims. It shortens the overall list of claims, since it avoids a five-fold duplication of recital of a single feature.

344 *Recites the crankshaft of claim 245 (66) reading on main claim 242 (61).*

345 *This is substantially as reviewed with the examiner, and is a claim on a substantial part of disclosure relating to tensile crank links, not previously claimed. (See Interview with the Examiner.)*

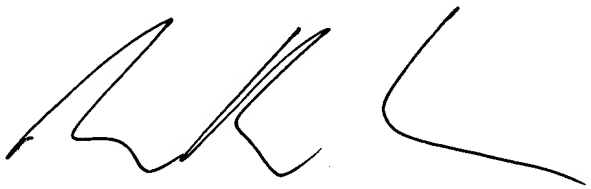
346 *Recites the "filamentary material" and "catalytic effect" of claims 250 (98), 270 (82), 265 (102) and 273 (103), reading on main claim 242 (61).*

347 *This is substantially as reviewed with the examiner, and is both an expansion of claim 257 (78), and a claim on the most substantial part of disclosure, relating to un-cooled engines. (See Interview with the Examiner.)*

348 *recites the compond engine with a turbine as second stage of claim 274 (90) reading on main claim 242 (61).*

The applicant respectfully submits that, since the main claims are allowable, all the dependant claims of this amendment are allowable too. He appreciates that the allowance of new dependant claims is at the discretion of the examiner.

Sincerely,



Mitja Victor Hinderks.

Sole inventor, applicant and power-of-attorney of record.